

June 15, 1854. (Continued.)

The EARL of ROSSE, President, in the Chair.

The following papers were read:—

V. “The Attraction of Ellipsoids considered generally.”
By MATHEW COLLINS, Esq., B.A. Communicated by
S. HUNTER CHRISTIE, Esq., M.A., Sec. R.S. &c. Received
April 27, 1854.

The author commences by stating, that the attraction of an ellipsoid on a point on its surface or within it, in a direction perpendicular to one of its principal planes, is proportional to the distance of the attracted point from that plane.

This general proposition, which is an extension to *ellipsoids* of those already given for *spheroids* in Airy's Tract “On the Figure of the Earth,” Prop. 8 and 10, and in MacLaurin's 4th Lemma, “*De causa physica Fluxus et Refluxus Maris*,” he demonstrates—

1. In the case when the attracted point is on the surface of the ellipsoid.

The demonstration of this is much like those given by the above-named authors for the less general case of spheroids, and its final step is effected by Cor. 1 to Prop. 87 of the first book of the *Principia*.

2. When the attracted point is within the ellipsoid.

The demonstration in this case is effected by showing that an ellipsoidal shell, bounded by two similar and similarly placed ellipsoidal surfaces, exerts no attraction on a point situated anywhere within it or upon its interior surface.

The foregoing proposition shows that the attraction of an ellipsoid on any point on its surface, or within it, can be got at once from the attraction of the same ellipsoid on a point placed at the extre-

mity of an axis, and the author proceeds to show how the latter attraction can be found and reduced to elliptic functions. He then gives this proposition :

Let a, b, c be the semiaxes of a homogeneous fluid ellipsoid, and A, B, C the forces acting on points at the extremities of a, b, c , caused partly by the ellipsoid's own attractions on its parts, and partly by centrifugal forces of revolution about an axis ($2c$), or by the action of an extraneous force directed towards its centre, and varying as the distance from the centre, then the ellipsoid will preserve its form if $Aa=Bb=Cc$.

The last proposition stated in the paper is thus given : let R and r be the radii of two homogeneous concentric spheres ; A and a the attractions of each on a point on the surface of the other, then $\frac{A}{R^2} = \frac{a}{r^2}$, whatever be the law of attraction as a function of the distance.

The demonstration given of the first of these two theorems is very concise, and of the second is direct and elementary.

VI. "Researches on the Impregnation of the Ovum in the Amphibia ; and on the Early Stages of Development of the Embryo." (Third Series.) From the MS. papers of the late GEORGE NEWPORT, F.R.S., F.L.S. &c. Selected and arranged by GEORGE Viner ELLIS, Esq., Professor of Anatomy in University College, London. Communicated by Sir JOHN FORBES, M.D., F.R.S. Received June 6th, 1854.

In this paper the author has given the result of further inquiries into the manner by which the frog's egg is impregnated, and has supplied in addition some very interesting facts respecting the development of the embryo during the earlier stages of its growth.

In consequence of the difficulties that arose in the course of the inquiry, and of the doubts that might be suggested by others from the difficulty of manipulating with the egg of the Amphibia unless certain precautions are taken, the author first describes the apparatus